

OPENING STATEMENT  
SAN BRUNO ACCIDENT INVESTIGATION  
RAVI CHHATRE, P.E.  
INVESTIGATOR-IN-CHARGE  
August 30, 2011

Good morning Chairman Hersman, Vice Chairman Hart, and members of the Board.

On September 9, 2010, at 6:11 p.m. Pacific daylight time, an intrastate natural gas transmission pipeline, Line 132, ruptured in a residential area in the city of San Bruno, California.

The rupture was located in Segment 180 of Line 132. Line 132 is owned and operated by Pacific Gas and Electric Company or PG&E.

PG&E's gas system includes over 42,000 miles of natural gas distribution pipelines and over 5,700 miles of natural gas transmission and gathering pipelines. PG&E is one of the largest gas and electric utility companies in the country.

The rupture occurred at the intersection of Earl Avenue and Glenview Drive.

About 47.6 million cubic feet of natural gas was released.

Typically, this is enough gas to serve the entire city of San Bruno for a month, and it was released in less than 2 hours.

The released natural gas was ignited, and the resulting fire destroyed 38 homes and damaged 70 others.

There were eight fatalities, many individuals were injured, and many more were evacuated from the area.

Next, I would like to show you a combined video of the event to give you a sense of the magnitude of the fire caused by the pipeline rupture.

A crater created by the pipeline rupture is shown here.

It is about 72 feet long by 26 feet wide.

A 28-foot long section of the ruptured pipe was blown about 100 feet from the crater.

This photograph shows a view of the accident scene looking south along Glenview Drive.

The crater created by the pipeline rupture is located in the right-hand foreground.

The 28-foot long section of ruptured pipe is also shown.

Line 132 is about 46 miles long and originates at the Milpitas Terminal, located in the bottom right of the diagram. It terminates at Martin Station, located in the upper left.

PG&E's gas transmission pipelines are controlled by a supervisory control and data acquisition center, or SCADA center, located in San Francisco.

PGE's records initially indicated that the pipe from Segment 180 at the rupture location was 30 inches in diameter, had a 0.375-inch thick wall, was seamless, met API Grade X42 carbon steel specifications, and was coated with asphalt.

Segment 180 was 1,742 feet long, and was installed in 1956 as part of a relocation of the pipeline, which was originally installed in 1948.

However, some of this information was inaccurate. The ruptured section was not seamless but had a longitudinal seam, and NTSB's laboratory testing found differences in the type of pipe in the rupture area.

On September 9th, prior to the accident, PG&E personnel were performing electrical work at the Milpitas Terminal, which is located about 39 miles southeast of the accident site.

During the course of this work, two power supply units experienced erratic voltage, causing regulating valves to move to a fully open position.

As a result, the discharge pressure in Line 132 at the Milpitas Terminal increased from about 360 pounds per square inch, or psi, to about 396 pounds per square inch.

At 5:45 p.m., the Line 132 pressure at Martin Station, which is about 7 miles north of the rupture location, exceeded 375 pounds per square inch.

The pressure in Line 132 at Martin Station continued to increase until it reached 386 pounds per square inch at 6:11 p.m.—the estimated time of rupture.

At 7:30 p.m., 79 minutes after the rupture, the upstream valve located about  $\frac{3}{4}$  of a mile south of the rupture location was closed.

At 7:46 p.m., 95 minutes after the rupture, two downstream valves at Healy Station, located about  $\frac{3}{4}$  of a mile north of the rupture location were closed, isolating the rupture.

This photograph shows the 28-foot long pipe segment that was found on the ground near the crater. The photograph was taken before any cleaning.

In pipeline terminology, a “pup” means a short pipe segment. Pups 1 through 4 in the ruptured pipe segment were between 3.5 and 4 feet long and were welded to each other circumferentially.

After laboratory examination, the NTSB materials laboratory staff determined that the rupture initiated along a seam weld in pup 1, as shown by the red arrows.

The ruptured pipe segment was separated from the downstream pipe in the girth weld between pup 4, which can be seen on the left hand side of the photograph, and pup 5, which is not shown.

In March of 2011, the NTSB hosted a 3-day investigative hearing on this accident in which all Board members participated. Chairman Hersman presided over the hearing.

After assessing the events of this accident and the information obtained during the investigative hearing, staff has identified the following safety issues:

Multiple deficiencies in PG&E's operations, such as record-keeping, the Integrity Management Program, SCADA operation, and emergency response.

Ineffective Federal and state oversight.

And inadequate Federal pipeline safety rules.

During the course of the investigation, staff discovered systemic deficiencies within PG&E as an organization. Presentations following me will cover SCADA operation, integrity management, record-keeping, and emergency response; and will clearly show widespread deficiencies in PG&E's procedures, processes, and management approach to safety that resulted in this tragic accident.

Many of these same deficiencies were identified in the NTSB's investigations of PG&E accidents that occurred in 2008 in Rancho Cordova and in 1981 in San Francisco.

Consequently, PG&E missed earlier opportunities to make corrections that could have prevented the San Bruno tragedy.

Organizational accidents typically have multiple contributing causes, involve people at numerous levels within the organization, and are characterized by a pervasive lack of proactive measures to ensure adoption and compliance with a safety culture. They are generally catastrophic in nature and require complex organizational changes.

All these aspects are present in this accident.

The staff therefore believes that this accident is indicative of an organizational accident.

During the course of this investigation, the NTSB issued 10 safety recommendations.

Three to the Pipeline and Hazardous Materials Safety Administration,

Three to the California Public Utilities Commission, and

Four to the Pacific Gas and Electric Company.

Parties to the investigation are:

The Pacific Gas and Electric Company, owner and operator of Line 132.

The California Public Utilities Commission, the state regulatory agency of intrastate gas transmission lines in California.

The Pipeline and Hazardous Materials Safety Administration or PHMSA, the Federal regulatory agency of interstate pipelines and monitor of state pipeline safety programs.

The city of San Bruno.

And the Engineers and Scientists of California and the International Brotherhood of Electrical Workers, unions that represent PG&E workers.

Vice Chairman Hart and his special assistant accompanied investigators to the accident scene.

In addition to me, the other members of the San Bruno investigation team are listed in the next four slides.

Twelve investigators were on scene for 9 days.

Additional investigators were added to the team as the investigation progressed.

The investigation involved going through literally thousands of pages of documents and records and conducting numerous interviews.

Additional members of NTSB's headquarters staff also provided technical and administrative support.

Madam Chairman, this concludes my opening statement. I will be glad to answer any questions that the Board may have, or if you desire we can proceed with Mr. Nicholson's presentation on pre-accident events at the Milpitas Terminal.